

**WRITTEN FINDINGS OF THE
WASHINGTON STATE NOXIOUS WEED CONTROL BOARD**

Scientific Name: *Egeria densa* Planch; Synonym: *Elodea densa* (Planch.) Vict.)

Common Name: Brazilian elodea, giant elodea

Family: Hydrocharitaceae

Legal Status: Class B: (a) regions 3, 4, 6, 7, 9, 10

Description and Variation: Brazilian elodea looks very much like a larger, more robust version of its commonly-found native relative, *Elodea canadensis* (waterweed). Brazilian elodea leaves are 1-3 cm long, up to 5mm broad, and are in whorls of four to eight. The leaves are minutely serrated, linear, and its short internodes frequently give the plant a very leafy appearance. The leaves and stems are generally a bright green. The lowest leaves are opposite or in whorls of 3, while the middle and upper leaves are in whorls of 4 to 8. Stems are erect, cylindric, simple or branched and grow until they reach the surface of the water where they form dense mats. The 18-25mm white flowers have three petals, are dioecious and float on or rise above the water's surface on thread-like hypanthiums produced from apical double nodes. White or pale, slender roots are unbranched. Adventitious roots are freely produced from double nodes on the stem.

Economic Importance: Brazilian elodea is a popular aquarium plant and can be found for sale in most pet shops, usually under the name Anacharis, although the sale of this plant in Washington is illegal. The trouble starts when Brazilian elodea is accidentally or deliberately introduced into lakes and ponds. The characteristics that make Brazilian elodea a good aquarium plant, also make it a nuisance plant out of its native habitat. Brazilian elodea forms dense monospecific stands that restrict water movement, trap sediment, and cause fluctuations in water quality. Dense beds interfere with recreational uses of a waterbody by interfering with navigation, fishing, swimming, and water skiing. An estimated 1500 acre feet of storage capacity were lost annually in Lake Marion, South Carolina due to sedimentation caused by Brazilian elodea growth. In New Zealand, electric generating plants were shut down when fragments of Brazilian elodea clogged intake structures on the Waikato River. In Washington State, local and state government and lake residents spend thousand of dollars every year to manage Brazilian elodea infestations. The cost of the control project in Silver Lake, Cowlitz County is over \$1,000,000.

Geographic Distribution: Brazilian elodea is native to the central Minas Geraes region of Brazil to the coastal areas of Argentina and Uruguay. Due to its popularity as an aquarium plant, Brazilian elodea has also spread to New Zealand, Australia, Hawaii, Denmark, Germany, France, Japan, and Chile. In the United States, this plant has run wild in fresh inland waters from Washington to Massachusetts, California, and Florida. In Washington State, Brazilian elodea has been reported in Long Lake, Kitsap County since the early 1970s. Brazilian elodea infests many western Washington lakes scattered over a wide geographic area. Lakes infested

include, but are not necessarily limited to: Duck Lake, Ocean Shores; Lake Limerick, Mason County; Big Lake, Skagit County; Silver Lake, Cowlitz County; Leland Lake, Jefferson County; Ohop Lake, Pierce County; Lacamas Lake, Clark County; and Black Lake, Pacific County. It, along with several other invasive aquatic plants, also infests the sloughs and drainage ditches in the Longview/Kelso area. Brazilian elodea has not yet been reported growing in eastern Washington Lakes. State officials in Oregon consider Brazilian elodea to be their worst aquatic plant problem.

Habitat: Brazilian elodea is a submersed, freshwater perennial herb, generally rooted on the bottom in depths of up to 20 feet or drifting. It is found in both still and flowing waters, in lakes, ponds, pools, ditches, and quiet streams. It tends to form dense monospecific stands that can cover hundreds of acres and can persist until senescence in the fall. High water temperatures (greater than 30 degrees centigrade) and high light intensities can cause senescence.

History: The earliest report of Brazilian elodea in the United States was from Millneck, Long Island where the plant was collected in 1893. It was offered for sale in the United States in 1915, where it was recommended as a good "oxygenator" plant. The first European record of this species outside of cultivation was in a canal in Leipzig, Germany in 1910.

Growth and Development: In Long Lake, Kitsap County about 25 percent of the biomass overwinters along the bottom in a dormant-like, evergreen condition. The plants initiate growth when water temperatures reach 10 degrees centigrade. Getsinger describes the life cycle of Brazilian elodea in Lake Marion, South Carolina as follows: Two major growth flushes occur in spring and fall. Each of these flushes are followed by periods of senescence, with a loss of biomass through sloughing and decay of tips and branches. Flowers are produced in late spring and again in the fall. The intensity of flowering varies from year to year. During the summer, profuse branching forms a canopy. The branches form dense, tangled mats on the water's surface.

Reproduction: Seeds and/or female flowers have never been reported from Brazilian elodea populations established in the United States. The absence of sexual reproduction in introduced populations of Brazilian elodea emphasizes the importance of the vegetative growth phase of the plant. Specialized nodal regions described as double nodes occur at intervals of 6 to 12 nodes along a shoot. A double node consists of 2 single nodes separated by a greatly shortened internode. Double nodes produce lateral buds, branches, and adventitious roots. Only shoot fragments of Brazilian elodea which contain double node regions can develop into new plants. The plant fragments readily and each fragment containing a double node has the potential to develop into a new plant. Plant root crowns also develop from double nodes along an old shoot. When a shoot sinks to the bottom during fall and winter senescence, a new root crown may develop at one or several double nodes along the new shoot. Brazilian elodea lacks specialized storage organs such as rhizomes or tubers and stores carbohydrates in stem tissues.

Response to Herbicides: Westerdahl and Getsinger report excellent control of Brazilian elodea with diquat and complexed copper, endothall dipotassium salt, and endothall and complexed copper. Good control was obtained with acrolein, diquat, and fluridone. California reports good control achieved using complexed copper alone. Of the above herbicides,

endothall, fluridone, and copper are permitted for aquatic use in Washington waters, but copper is generally permitted only as an algicide.

Response to Cultural Methods: Localized control (in swimming areas and around docks) can be achieved by covering the sediment with a opaque fabric which blocks light from the plants. Managers of reservoirs and some lake systems may have the ability to lower the water level as a method of managing aquatic plants. Goldsby and Sanders reported that consecutive drawdowns in Black Lake, Louisiana eradicated Brazilian elodea. They noted that consecutive drawdowns may be more effective than an individual drawdown. The success of a drawdown is dependent on several factors such as degree of desiccation (drawdowns in rainy western Washington are often ineffective), the composition of substrate (sand vs. clay), air temperature (the exposed sediments need to freeze down to 8-12 inches), and presence of snow.

Response to Mechanical Methods: Because this plant spreads readily through fragmentation, mechanical controls such as cutting, harvesting, and rotoation (underwater rototilling) should be used only when the extent of the infestation is such that all available niches have been filled. Using mechanical controls while the plant is still invading, will tend to enhance its rate of spread. Harvesting removes surfacing mats and creates open areas of water. Harvesting has been used extensively on Long Lake, Kitsap County to control Brazilian elodea.

Biocontrol Potentials: It is unknown what, if any, insects or pathogens have biocontrol potential for Brazilian elodea. Fortunately triploid grass carp find Brazilian elodea highly palatable and they have been successfully employed as a management tool in Devils Lake, Oregon and Silver Lake, Cowlitz County to control Brazilian elodea populations. Brazilian elodea is highly preferred over most native species and theoretically, it should be possible to remove Brazilian elodea while favoring the growth of native species. However, in practice, grass carp often remove the entire submersed aquatic community and should be used with great care.

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*References available from the Washington State Noxious Weed Control Board office in Kent.

Brazilian Elodea
(*Egeria densa* Planch.)



Key features:

- Submersed, sometimes with floating white flowers
- Leaves in whorls of four or eight
- Leaves greater than one-half inch long and less than one-quarter inch wide
- No tubers attached to roots in sediment